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736-6 Economic Impact of Advancing Implantable Cardioverter Defibrillator Technologies: Decreased Monetary Costs and Earlier Hospital Discharge

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The recent advances in implantable cardioverter defibrillator (ICD) technologies allow ICDs with non-thoracotomy leads (NTL), obviating the need for open chest surgery; smaller generator volumes allow prepectoral implant of NTL-ICDs, obviating the need for abdominal surgery. To formally assess the economic impact of these improvements, the physician and hospitalization charges, (implant to discharge) for 36 patients who received ICD systems (same manufacturer; 9/92–1/94) were determined. Nine patients received the ICD epicardial without other cardiac surgery (EPI); 15 received an NTL-ICD subrectus (NTL AB); 12 received a smaller volume NTL-ICD prepectoral (NTL PP). [P-values are EPI vs NTL AB / NTL AB vs NTL PP].

	EPI	NTL AB	NTL PP	p-value
Age (yrs)	66 ± 9	64 ± 15	66 ± 10	ns/ns
LVEF (%)	38 ± 16	33 ± 17	35 ± 14	ns/ns
Post-op hosp. (d)	8 ± 5	5 ± 3	3 ± 2	0.04/0.01
Charges ($1,000)	24 ± 9	21 ± 4	13 ± 4	ns/0.004

The prepectoral implant approach for NTL ICDs led to less postoperative hospitalization and at least a 35% lower cost as compared to abdominal NTL or epicardial ICD implant approaches. ICD technology evolution is associated with lower health care resource utilization per patient. This is an example of progress in health technology associated with less monetary costs.

737 Biochemical Markers: For Reperfusion and for Acute Myocardial Infarction

Tuesday, March 21, 1995, 8:30 a.m.–10:00 a.m.
Ernest N. Morial Convention Center, Room 21

8:30

737-1 Heart Fatty Acid-binding Protein and Myoglobin can Accurately Detect Successful Reperfusion as Early as 15 Minutes After Reperfusion

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Human heart fatty acid-binding protein (FABP) is an abundant low molecular weight protein in cytoplasm of myocardial cell similar to myoglobin (Mb). To evaluate whether FABP can also detect successful reperfusion very early like Mb, we examined serum FABP and Mb levels in 45 patients (pts) undergoing PTCR or PTCA within 6 hours after the onset of acute myocardial infarction. Coronary angiography was performed every 5 minutes (min) during reperfusion therapy to determine the exact time of reperfusion. In 30 pts with reperfusion (reperfused group: TIMI grade 3 [23 pts] and grade 2 [7 pts]), serum samples were taken just before and at 15, 30 and 60 min after initial angiographic confirmation of reperfusion. In 15 pts without reperfusion (nonreperfused group), serum samples were taken just before and at 15, 30 and 60 min after the initiation of therapy. FABP was measured by competitive enzyme immunoassay and Mb by latex agglutination turbidimetry. The FABP ratio (FABP after/FABP before) and Mb ratio (Mb after/Mb before) were calculated. FABP and Mb levels increased rapidly, peaked within 60 min after reperfusion. The FABP and Mb ratios in the reperfused group significantly ($p < 0.01$) exceeded those in the nonreperfused group at 15, 30 and 60 min. The sensitivity (Sen) and specificity (Spe) of these markers for reperfusion were as follows:

Criteria	15 min		30 min		60 min	
	Sen	Spe	Sen	Spe	Sen	Spe
FABP ratio >1.6*	93%	100%	97%	100%	100%	100%
Mb ratio >2.4**	90%	100%	93%	100%	100%	100%

* mean + 2SD at 60 min in the nonreperfused group, ** published criteria

Conclusion: FABP, like Mb could accurately detect successful reperfusion as early as 15 min after reperfusion and could provide a high level of accuracy within 60 min after reperfusion.

8:45

737-2 Heart Fatty Acid-binding Protein can Provide a Higher Level of Accuracy than Myoglobin for the Early Detection of Acute Myocardial Infarction

Junnichi Ishii, Masanori Nomura, Toshikazu Ando, Mamoru Kimura, Hiroshi Kurokawa, Takeshi Kondo, Yoshihiko Watanabe, Hitoshi Hishida. *Fujita Health University, Toyoake, Japan*

Heart fatty acid-binding protein (HFABP) is a cytoplasmic low molecular weight protein similar to myoglobin (Mb). The skeletal muscle Mb content is approximately twice that of the heart while the HFABP concentration in striated muscle is only 10–50% of that in cardiac muscle. To evaluate the usefulness of HFABP for the early detection of acute myocardial infarction (AMI), we measured serum HFABP and Mb levels in the initial samples in 114 patients (pts) brought to our coronary care unit within 3 hours following onset of symptoms. AMI was confirmed in 63 pts by history, ECG changes and the pattern of serum CKMB release and was excluded in 51 pts. HFABP was measured by competitive enzyme immunoassay and Mb by latex agglutination turbidimetry. HFABP in the 63 pts with AMI (mean ± SD, 58 ± 50 ng/ml) significantly ($p < 0.01$) exceeded those in the pts without AMI (8.8 ± 6.2 ng/ml). Figure shows the receiver operating characteristic (ROC) curves for the detection of AMI within 3 hrs of the onset (1.9 ± 0.7 hrs). The upward and leftward shift in the ROC curve was greater for the HFABP than the Mb. The sensitivity and specificity of HFABP >14 ng/ml (mean + 2SD in 50 healthy volunteers) for the detection of AMI within 3 hours of the onset were 73% and 80%, respectively. Those of Mb >88 ng/ml(mean + 2SD in 50 healthy volunteers) were 73% and 61%, respectively. *Conclusion:* HFABP could provide a higher level of accuracy than the Mb for detecting AMI within 3 hours of the onset.

9:00

737-3 Rapid Whole Blood Bedside Cardiac Troponin T Immunoassay for the Diagnosis of Acute Myocardial Infarction

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Cardiac troponin T (cTT) is a regulatory contractile protein normally not found in the blood. Its detection in the circulation has been shown to be a sensitive and specific marker for acute myocardial infarction (AMI). The Elisa cTT presently requires at least 90 minutes, which is too long to be useful in emergency situations.

We tested a new rapid bedside whole blood immunoassay for cTT in 32 consecutive patients admitted to the Geneva University Hospital for suspected AMI, with an onset of pain within 12 hours. The new rapid assay, the Elisa cTT, the creatine kinase (CK) and creatine kinase-MB (CK-MB) were performed at admission, 4 and 8 hours after admission.

The rapid assay was positive in all 25 patients subsequently shown to have an AMI. In the 7 patients without AMI, the assay was negative in 6, and positive in 1 (myopericarditis). At each time of the three measurements, the rapid assay had a similar or a better sensitivity and specificity than CK-MB or Elisa cTT. Already 4 hours after admission, the rapid assay reached a sensitivity of 100%, which is better than the CK-MB (96%).

Results of the rapid assay were obtained in 15 minutes, even less in all positive cases, and the time to get a positive result correlated with the cTT Elisa and CK-MB levels.

Our results allowed us to conclude that, while considerably more rapid than conventional assays, this new bedside whole-blood troponin T assay also has equal or better sensitivity and specificity than the other tests. In addition, we would like to stress the simplicity of this rapid assay, that can be performed on the spot, without laboratory infrastructure or equipment.

9:15

737-4 Serum Cardiac Troponin T Measurements in Unstable Angina: An Early, Accurate Marker of Increased Risk

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Mild myocardial damage due to prolonged ischemia or platelet microemboli may be common in unstable angina and may be predictive of early complications. To test these hypotheses, we screened 486 consecutive patients presenting to a hospital emergency room with chest pain to identify 131 with unstable angina. All had measurements of serum troponin T, creatine kinase (CK) and CK-MB on admission. A CK level >225 U/L, a CK-MB >10 ng/ml or a troponin T >0.1 μg/L were considered elevated. Troponin T levels were not reported to the treating physician. All patients were followed prospectively for 3 weeks to tabulate coronary events. Troponin T levels were elevated in 26